

## Neither Brakes Nor Umbrellas: Efficiency and Productivity in European Dairy Farms During the Milk Quota System Phasing Out

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### Extended abstract

On 31st March 2015 the era of milk quotas is officially over. Since 2004 a transition regime – made of lower support prices, weaker protection of domestic supply and higher authorized deliveries, and direct sales – has been implemented.

Several studies have been carried out in order to assess the impact of the new policy framework on the global dairy market arena. According to USDEC (2015), EU milk production will be about 11% higher in 2020 than it was seven years before. The benefits of the supply growth will be concentrated in the Northern European countries. In the same period, the projected growth of EU dairy export flows is estimated to be about 5-6%. Other studies substantially validate the scenario drawn by USDA. Jansik et al. (2014) talk about a really true “Northern Europe Milk Belt” perspective for the next years. Chantreuil et al. (2008), Witzke e Tonini (2008), Réquillart et al. (2008), Bouamra-Mechemache et al. (2008), Kempen et al. (2011) foresee an increase in European milk supply as well as a price reduction.

The new dairy institutional regime is able to reinforce the competitive position of European producers in the global arena as well as to re-distribute the milk supply among the European countries. The efficiency and the productivity capacity of producers will play an important role in this game in order to expand production and, as a consequence, profitability.

The aim of this paper is to evaluate the efficiency and the factor productivity change of the dairy farms in the EU countries in the last years in order to determine the technical conditions of European farmers at the starting point of the new regime. Analysis allows us to estimate the role of efficiency in conditioning productivity in order to understand how much efficiency can concur to affect productivity after the abolition of the milk quotas. Some policies implications derive from the findings.

A Data Envelopment Analysis (DEA) using *output-oriented approach* was applied on aggregate data related to 22 European countries over the 2004-2012 period. DEA allowed us to calculate technical efficiency (TE) – both Constant Return to Scale (CRS) DEA and Variable Return to Scale (VRS) measures – scale efficiency (SE) and the Malmquist Total Factor Productivity Index (TFP). The latter serves to estimate the productivity change over a period (Berg et al., 1992) and it permitted to decompose TFP into more components, *i.e.* 1) the technical efficiency changes; 2) the technological changes; 3) the pure efficiency changes,

and 4) the scale efficiency changes. To be more precise, the change in technical efficiency is described as the efficiency in reaching to the production limit and technological change as the curve shift in productivity limit (Mahadevan, 2002).

Farm Accounting Data Network (FADN) data of milk specialized producers were used (European Commission, 2015). Specifically, we introduced average farm data for each country and for each observed year in the model. In other terms, output and input values involved in the analysis correspond to the annual mean farm values by each country.

Results indicate that TE obtained for the CRS and VRS frontiers are, on average, very close to full efficiency. Considering the latter measure – the so call “pure efficiency” – the results imply that European milk specialized farmers would be able to increase output by less than 1% using their disposable resources more effectively (at the present state of technology) over the 2004-2012 period. Therefore, results suggest that milk farms show small rooms for improving efficiency in using their own technical inputs.

SE also was found, on average, close to unity, implying that production can increase of 1-2% in case of farms adjust their production scale as to efficiently produce.

Estimation of TFP and its components suggests that European milk sector has suffered a decline in productivity changes. Indeed, the TFP change (TFPC) suggests that, during the period, there has been a generalized “technological” regression and TFP has grown with decreasing progression.

The high efficiency that characterizes the sector plays a neutral role in conditioning the not optimal TFPC since effects provided by efficiency components (technical efficiency changes, pure efficiency changes and scale efficiency) are all, on average, equal to 1 or slightly more than the unity. It implies that milk producers have to be considered efficient and the productivity reduction – especially found after 2009 – might not depend on ability of dairy farmers in efficiently using their inputs but it is mainly related to other factors (*e.g.*, market shocks; milk prices volatility).

Findings partially suggest that exogenous factors might be influent in affecting efficiency and productivity. In 2010 – after than from 2009 to 2010 world milk prices have dramatically decreased and milk deliveries have gone down in Europe - the technological change switches from a score over the unity to a score under the unity, indicating that European farmers were not able in hoisting their efficiency levels (retrogression of the production frontier). Vice versa, in the same period, technical efficiency has greatly concurred in determining TFP change switching from less to more than unity. Probably this derives from more attention paid by farmers in utilizing their own technical inputs as to countervail reduction in milk supply and production capabilities. This is a critical point because we found that small margins for increasing (technical and scale) efficiency exist in the European milk production sector. It means that external factors independent from farmers’ capacity in using technical inputs can play a greater role than efficiency in conditioning productivity and, as a consequence, profitability in the next future. Elimination of production cap due to abolition of milk quotas can marginally contribute to increase milk farm productivity, because it might basically depend on exogenous factors that affect technology.

Therefore, CAP 2014-2020 should mostly enforce its effectiveness in promoting policies not directly based on improving dairy farm efficiency. Confining prices fluctuations into a tunnel as well as supporting dairy farmers through direct payments can be good tools in order to

contain the expected increase in price volatility, to guarantee income stability to farmers, and to ensure a market scenario where farms can be competitive beyond 2015. On the other hand, CAP can also strengthen measures devoted to increase efficiency in that countries where TE and SE are not fully efficient. Basically, some differences in estimated efficiency among countries might due to structural farms differences (*e.g.*, farm size, farmer age, climate conditions) or, vice versa, to their management abilities. In the former case, adjusting some structural constraints can improve scale efficiency and, as a consequence, productivity, whereas in latter case, improvement of the management systems in farms should be fostered in order to have more efficient farmers.

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